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Precedent non-sustained ventricular tachycardias predicts subsequent ICD interventions and heart failure hospitalization in primary prevention ICD patients

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Background: The prognostic implications of non-sustained ventricular tachycardia (NSVT) and their significance as therapeutic targets in patients without prior sustained ventricular arrhythmia remain to be clarified.

Purpose: The aim of this study was to investigate the prognostic significance of asymptomatic NSVT in patients who had primary prevention implantable cardioverter-defibrillator (ICD) implantation due to ischemic or non-ischemic cardiomyopathy (ICM, NICM).

Methods: We enrolled 170 consecutive primary prevention ICD patients without previous appropriate ICD therapy (AIT). Patients were allocated to two groups depending on the presence or absence of NSVT in a 6-month period prior to enrollment. The incidence of AIT due to ventricular tachyarrhythmias and unplanned hospitalization due to decompensated heart failure were assessed as endpoints during follow-up.

Results: In 51 patients (30%), precedent NSVT was documented. During a median follow-up of 1010 days, AIT occurred in 36 patients (21%) and unplanned hospitalization was observed in 33 patients (19%). In precedent NSVT patients, the incidence of AIT and unplanned hospitalization was significantly higher as compared to patients without precedent NSVT (AIT: 29/51 [57%] vs 7/119 [6%], log-rank, P<0.001; hospitalization: 16/51 [31%] vs 17/119 [14%], log-rank, P=0.030). Cox-regression demonstrated that precedent NSVT independently predicted AIT after adjustment for the other related risk factors (hazard ratio [HR] 13.1, 95% confidence interval [CI] 5.66-30.3, P<0.001). In subgroup analyses, precedent NSVT predicted AIT in both ICM and NICM patients (HR 29.0, 95%CI 6.84-123, P <0.001; HR 5.37, 95%CI 1.54-18.7, P=0.012, respectively), but predicted hospitalization only in patients with ICM (P=0.0056). The number and maximal duration of recorded NSVT was significantly more frequent and longer in patients with AIT as compared to those without AIT (5.6±6.4 vs 0.5±1.5 episodes /6 months, 7.5±6.0 vs 0.7±2.1 seconds, respectively, P<0.001). Receiver operating characteristic curve analysis revealed that = 1 episode of NSVT within 6 months prior to the enrollment predicted AIT with 84% specificity and 81% sensitivity (C-statistic = 0.85).

Conclusions: Precedent NSVT in patients with primary prevention ICDs is associated with subsequent appropriate ICD therapies, and is an independent predictor of unplanned HF hospitalizations in ICM patients. The frequency and maximal duration of precedent NSVT were associated with higher incidence of subsequent AIT. Early interventions targeting NSVT in primary prevention ICD patients should be investigated in future studies.